What is claimed is:

1. In computational circuitry for determining a baseband multiplex signal (BBMUX) by demodulating a complex FM base-band signal requiring calculation of the arctan IM/RL where IM represents the imaginary or quadrature portion of the complex signal and varies as a function of θ, and RL represents the real or in-phase portion of the complex signal, and varies also as a function of θ, and wherein RL will be a value between –1 and +1 as determined by the function cosine θ, the method of demodulation comprising the steps of:

adding a numerical value N to RL in the term 1/RL to obtain 1/RL+N;

providing a look-up table having a range determined by the function 1/cosine θ + N to obtain a range of values between 1/N+1 and 1/N-1;

multiplying IM times the corresponding value of 1/RL + N from said look-up table;

determining a scaled BBMUX signal (equivalent to Θ) from the arctan of (IM/RL+N);

determining the value of a scaling factor K; and

multiplying K times the scaled value of the BBMUX signal to recover the approximate BBMUX signal.

2. The method of Claim 1 where N ranges between about 1.1 and about 5.

3. The method of Claim 2 wherein N is equal to the numerical value 2.

4. The method of Claim 1 wherein said computational circuitry is a fixed point DSP.

5. The method of claim 1 wherein said BBMUX signal is a composite signal comprising a pilot signal having a known frequency and left and right message signals, and said method further decodes said BBMUX signal comprising the steps of:

sampling said approximate BBMUX signal at a rate "S" times the pilot signal frequency;

determining N points of DFT (differential fourier transform) pilot snapshot data at each of the sin and cos of the angles 45, 90, 135, 180, 225, 270, 315 and 360 for a total number "TN" of data points comprising the steps of,

setting each point corresponding to the sin of 0, 180, and the cos of 90 and 270 = 0,

setting each point corresponding to the sin of 90 and 270, and the cos of 0 and 180 to the magnitude of the pilot signal,

determining the value of each point corresponding to the sin and or cos of 45, 135, 225 and 315 by multiplying times 0.707;

passing said BBMUX signal through a polyphase filter;

recovering a message signal representing the composite left and right message signals by comparing said polyphase filtered BBMUX signal and said DFT pilot snapshot data;

separating said composite left and right message signals from said composite message signal.

6. The method of claim 1 wherein said sampling rate S is eight times the pilot signal frequency and the total number TN of data points is 128.

7. The method of claim I wherein said scaling factor is determined by determining the ratio of the maximum value of arctan IM/RI with the maximum value of arctan (IM/RI + N).

8. In a DSP circuit for determining a baseband multiplex signal (BBMUX) by demodulating and decoding a complex FM base-band signal requiring calculation of the arctan IM/RL where IM represents the imaginary or quadrature portion of the complex signal and varies as a function of θ, and RL represents the real or in-phase portion of the complex signal and varies as a function of cosine θ such that its value will be equal to a value between –1 and +1 as determined by the function cosine θ, the method of demodulating comprising the steps of:

adding a numerical value 2 to RL in the term 1/RL to obtain 1/RL+2;

providing a look-up table having a range of between 1 and 1/3;

multiplying IM times the corresponding value for 1/RL+2;

determining a scaled BBMUX signal (equivalent to Θ) from the arctangent of each value determined by multiplying IM times the computed value from the look-up table;

determining the value of a scaling factor K; and

multiplying K times the scaled BBMUX signal to recover the approximate BBMUX signal.

9. The method of claim 8 wherein said BBMUX signal is a composite signal comprising a pilot signal having a known frequency and left and right message signals, and said method further decodes said BBMUX signal comprising the steps of:

sampling said approximate BBMUX signal at a rate "S" times the pilot signal frequency;

determining N points of DFT (differential fourier transform) pilot snapshot data at each of the sin and cos of the angles 45, 90, 135, 180, 225, 270, 315 and 360 for a total number "TN" of data points comprising the steps of,

setting each point corresponding to the sin of 0, 180, and the cos of 90 and 270 = 0,

setting each point corresponding to the sin of 90 and 270, and the cos of 0 and 180 to the magnitude of the pilot signal,

determining the value of each point corresponding to the sin and or cos of 45, 135, 225 and 315 by multiplying times 0.707;

passing said BBMUX signal through a polyphase filter;

recovering a message signal representing the composite left and right message signals by comparing said polyphase filtered BBMUX signal and said DFT pilot snapshot data;

separating said composite left and right message signals from said composite message signal.

10. The method of claim 8 wherein said scaling factor is determined by determining the ratio of the maximum value of arctan IM/RI with the maximum value of arctan (IM/RI + N).